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43. (Twice Amended) The method of claim 34, wherein the treating the silicon carbide layer and the depositing the silicon carbide layer are performed in a single process chamber.

E5 44. (Cancelled) The method of claim 37, wherein the treating the first layer and the depositing the first layer are performed in a single process chamber.

45. (Twice Amended) The method of claim 34, wherein the treating the silicon carbide layer does not substantially change a composition of the silicon carbide layer as detected by a fourier transform infrared analysis.

E6 48. (Cancelled) A method of treating a silicon carbide containing layer deposited on a semiconductor substrate, comprising exposing the silicon carbide containing layer to a plasma consisting essentially of an inert gas to increase adhesion and oxidation resistance of the silicon carbide containing layer.

REMARKS

This is intended as a full and complete response to the Office Action dated April 18, 2003, having a shortened statutory period for response set to expire on July 18, 2003. Claims 24-26, 28, 30-38, 40, 42-45, and 48, are pending in this application. Claims 24-26, 28, 30-38, 40, 42-45, and 48, were considered and stand rejected. Applicants cancel claims 25, 28, 32, 37, 40, 44, and 48, without prejudice. Applicant believes that no new matter has been introduced in this response.

Claims 24-26, 28, 30-38, 40, and 42-45, are rejected under 35 U.S.C. § 112, first paragraph. Applicants have amended the claims to meet the §112 rejections, and therefore, Applicants respectfully request withdrawal of the rejections to claims 24-26, 28, 30-38, 40, and 42-45.

Claims 24, 26, 31, 34-36, 38, 43, and 45, are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Mori* as discussed in section 7 of paper No. 15, in view of

Park et al. The Examiner asserts that it would have been obvious to modify the process of *Mori* with the layer deposition techniques as taught by *Park et al.* The Applicants respectfully traverse to this rejection.

Mori discloses a plasma etch process for removing spin-on-glass from the edge portion of a substrate by activating a gas near the edge portion of the substrate and then directing activated species and unnecessary matter away from the substrate so the middle area of the substrate containing active elements and electrical components can be protected from the activate species. (*See*, column 5, lines 23-38.) *Park et al.* discloses treating a deposited material to have an electrical polarity and then depositing a second material having an electrical polarity opposite of the surface of the treated first material. (*See*, column 4, lines 27-36.) There is no suggestion or motivation in either *Mori* or *Park et al.* to combine the plasma etching process of *Mori* with the layer deposition techniques as taught by *Park et al.*

Thus, the combination of *Mori* and *Park et al.*, does not teach, show, or suggest depositing a first layer comprising silicon carbide on the semiconductor substrate, exposing the first layer to a plasma consisting essentially of an inert gas, and depositing a second layer comprising a material selected from the group of un-doped silicon glass, fluorine-doped silicon glass or silicon-carbon-oxygen based materials over the first layer, as recited in claim 24 and claims dependent thereon.

The combination of *Mori* and *Park et al.*, does not teach, show, or suggest depositing a silicon carbide layer on a semiconductor substrate, treating the silicon carbide layer with a plasma consisting essentially of an inert gas, and depositing a layer comprising a silicon-carbon-oxygen based material over the silicon carbide layer, as recited in claim 34 and claims dependent thereon. Applicants respectfully request withdrawal of the rejection.

Claims 24-26, 28, 30-38, 40, 42-45 and 48 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Nguyen et al.* ('935) as discussed in section 6 & 8 of Paper No. 15, in view of *Tanabe et al.* as discussed in Section 8 of Paper No. 15, and further view of *Goel et al.* The Examiner asserts that it would have been obvious to use the coating of *Goel et al.*'s deposits for the *Tanabe et al.* carbonaceous layer and *Nguyen et al.*'s dielectric layer. Applicants respectfully traverse to this rejection.

Nguyen et al. discloses enhancing the adhesion of a polymeric fluorocarbon layer and a substrate by an interlayer of silicon and/or silicide or by an argon sputter process if the substrate is a silicon-containing material. (*See*, column 2, lines 22-65.) *Tanabe et al.* discloses depositing a carbon containing intermediate layer on a substrate for reinforcing the interface between the substrate and a subsequently applied diamond film. (*See*, column 8, lines 62-65.) *Goel et al.* discloses depositing an interlayer of silicon carbide or other material prior to depositing a diamond-like nanocomposite of a diamond like carbon-hydrogen network interpenetrated with a glass-like silicon-oxide network. (*See*, column 4, lines 5-67.).

The combination of *Goel et al.*, *Tanabe et al.*, and *Nguyen et al.,* does not teach, show, or suggest depositing a first layer comprising silicon carbide on the semiconductor substrate, exposing the first layer to a plasma consisting essentially of an inert gas, and depositing a second layer comprising a material selected from the group of un-doped silicon glass, fluorine-doped silicon glass or silicon-carbon-oxygen based materials over the first layer, as recited in claim 24, and claims dependent thereon, as recited in claim 24 and claims dependent thereon.

The combination of *Goel et al.*, *Tanabe et al.*, and *Nguyen et al.,* does not teach, show, or suggest depositing a silicon carbide layer on a semiconductor substrate, treating the silicon carbide layer with a plasma consisting essentially of an inert gas, and depositing a layer comprising a silicon-carbon-oxygen based material over the silicon carbide layer, as recited in claim 34 and claims dependent thereon. Applicants respectfully request withdrawal of the rejection.

Claim 48 is rejected under 35 U.S.C. § 103(a) as being unpatentable over *Nguyen, et al.* in view of *Tanabe, et al.* as applied in Paper No. 15, Section 8. Applicants have cancel claim 48 without prejudice and respectfully request withdrawal of the rejection.

Claims 24-26, 28, 30-38, 40, 42-45, and 48, are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 3-5, 8, 10-11, 13-15, 18-22, 24-24 (as published in 2002/0016085A1) of co-pending Application No. 09/902,518.

Applicants acknowledge the provisional double-patenting rejection by the Examiner and will file a terminal disclaimer as necessary when the rejection is no longer provisional.

Claims 24-26, 28, 31-38, 40, 43-45, and 48, are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Park et al.* in view of *Mase et al.* The Examiner asserts that it would have been obvious to modify the process of *Park et al.* with the dielectric material as taught by *Mase et al.* Applicants respectfully traverse this rejection.

Park et al. is described above. *Mase et al.* discloses a two-layer structure using an etching stopper first insulating film and a readily etched second insulating film disposed thereon, and then using a resist layer for a two step etching process through the second and first insulating films. There is no suggestion or motivation in either *Park et al.* or *Mase et al.* to exchange the two different etch resistant materials of *Mase et al.* with the polarized layers of *Park et al.*

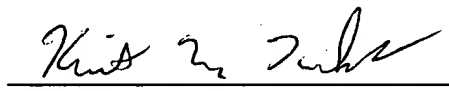
Thus, the combination of *Mase et al.* and *Park et al.*, does not teach, show, or suggest depositing a first layer comprising silicon carbide on the semiconductor substrate, exposing the first layer to a plasma consisting essentially of an inert gas, and depositing a second layer comprising a material selected from the group of un-doped silicon glass, fluorine-doped silicon glass or silicon-carbon-oxygen based materials over the first layer, as recited in claim 24 and claims dependent thereon.

The combination of *Mase et al.* and *Park et al.*, does not teach, show, or suggest depositing a silicon carbide layer on a semiconductor substrate, treating the silicon carbide layer with a plasma consisting essentially of an inert gas, and depositing a layer comprising a silicon-carbon-oxygen based material over the silicon carbide layer, as recited in claim 34 and claims dependent thereon. Applicants respectfully request withdrawal of the rejection.

The prior art made of record is noted. However, it is believed that the secondary references are no more pertinent to the Applicants' disclosure than the primary references cited in the office action. Therefore, it is believed that a detailed discussion of the secondary references is not deemed necessary for a full and complete response to this office action. Accordingly, allowance of the claims is respectfully requested.

In conclusion, the references cited by the Examiner, neither alone nor in combination, teach, show, or suggest the method or apparatus of the present invention. Having addressed all issues set out in the office action, Applicant respectfully submit that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,



Keith M. Tackett
Registration No. 32,008
MOSER, PATTERSON & SHERIDAN, L.L.P.
3040 Post Oak Blvd., Suite 1500
Houston, TX 77056
Telephone: (713) 623-4844
Facsimile: (713) 623-4846
Attorney for Applicant(s)

VERSION WITH MARKINGS TO SHOW CHANGES MADE

24. (Twice Amended) A method of processing a semiconductor substrate, comprising:

depositing a first layer comprising silicon carbide on the semiconductor substrate[, the first layer comprising a material selected from the group consisting of organic polymeric materials, αC, αFC, SiCOH, and SiC];

exposing the first layer to a plasma consisting essentially of an inert gas; and

depositing a second layer comprising [silicon] a material selected from the group of un-doped silicon glass, fluorine-doped silicon glass, and silicon-carbon-oxygen based material over the first layer.

33. (Thrice Amended) The method of claim 26, wherein [the first layer comprises silicon carbide and the] exposing the first layer to the plasma does not substantially change a composition of the first layer as detected by a fourier transform infrared analysis.

34. (Twice Amended) A method of processing a semiconductor substrate, comprising:

depositing a [first layer] silicon carbide layer on a semiconductor substrate[, the first layer comprising a material selected from the group consisting of SiCOH and SiC];

treating the [first layer] silicon carbide layer with a plasma consisting essentially of an inert gas; and

depositing a [second] layer comprising [silicon] a silicon-carbon-oxygen based material over the [first layer] silicon carbide layer.

35. (Twice Amended) The method of claim 34, wherein the treating the [first layer] silicon carbide layer increases the oxidation resistance of the [first layer] silicon carbide layer.

36. (Amended) The method of claim 34, wherein the treating the [first layer] silicon carbide layer prevents delamination of the [second] layer comprising the silicon-carbon-oxygen based material from the [first layer] silicon carbide layer.

42. (Twice Amended) The method of claim 34, wherein the treating the [first] silicon carbide layer comprises exposing the [first] silicon carbide layer to the plasma generated by flowing the inert gas into a processing chamber at a rate of about 100 to about 4000 sccm, establishing a chamber pressure between about 1 to about 12 Torr, and applying RF power to an electrode of the chamber to provide a power density of about 0.7 to about 11 W/in^2.

43. (Twice Amended) The method of claim 34, wherein the treating the [first] silicon carbide layer and the depositing the [first] silicon carbide layer are performed in a single process chamber.

45. (Twice Amended) The method of claim 34, wherein the treating the [first] silicon carbide layer does not substantially change a composition of the [first] silicon carbide layer as detected by a fourier transform infrared analysis.